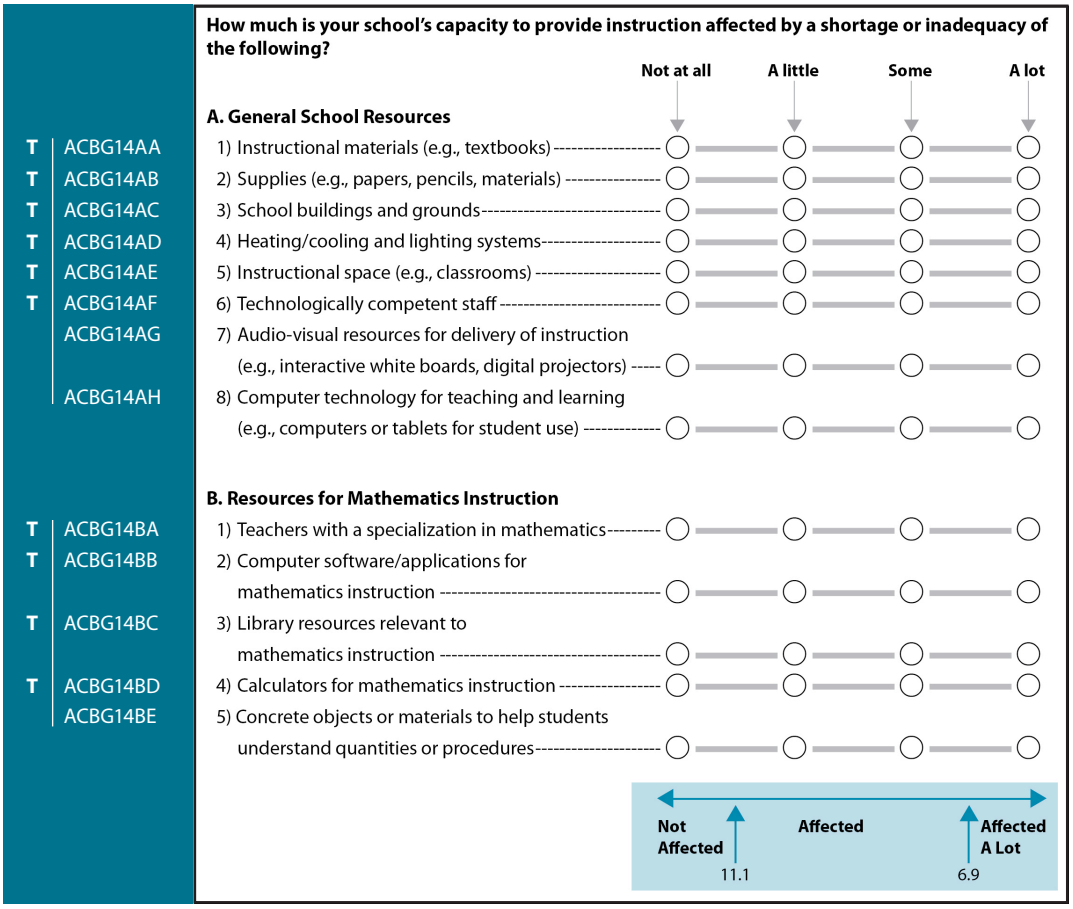
Instruction Affected by Mathematics Resource Shortages–Principals' Reports Scale, Fourth Grade

The Instruction Affected by Mathematics Resource Shortages–Principals' Reports (MRS) scale was created based on principals' responses concerning thirteen school and classroom resources described below.

Items in the TIMSS 2015 Instruction Affected by Mathematics Resource Shortages–Principals' Reports Scale, Fourth Grade



T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Instruction Affected by Mathematics Resource Shortages – Principals' Reports Scale, Fourth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
ACBG14AA	-0.11368	-0.14996	-0.16025	0.31021	0.88
ACBG14AB	-0.41885	-0.32199	0.24004	0.08195	0.86
ACBG14AC	0.07784	-0.85921	0.21812	0.64109	1.07
ACBG14AD	-0.21398	-0.48151	0.11638	0.36513	0.89
ACBG14AE	0.19673	-0.49556	-0.02468	0.52024	1.03
ACBG14AF	0.14704	-1.22945	-0.05377	1.28322	0.98
ACBG14AG	0.13794	-1.04602	0.15706	0.88896	0.97
ACBG14AH	0.36809	-1.19595	0.07061	1.12534	1.07
ACBG14BA	-0.05349	-0.40689	-0.11097	0.51786	1.04
ACBG14BB	0.18965	-1.45960	0.04141	1.41819	1.01
ACBG14BC	0.10994	-1.52282	0.10727	1.41555	1.08
ACBG14BD	-0.54492	-0.79258	0.20495	0.58763	1.28
ACBG14BE	0.11769	-1.09911	-0.18316	1.28227	0.87

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Scale Transformation Constants for the TIMSS 2015 Instruction Affected by Mathematics Resource Shortages – Principals' Reports Scale, Fourth Grade

Scale Transformation Constants	
A = 8.983616	Transformed Scale Score = 8.983616 + 1.470593 • Logit Scale Score
B = 1.470593	

Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 Instruction Affected by Mathematics Resources Shortages - Principals' Reports Scale, Fourth Grade

Raw Score	Transformed Scale Score	Cutpoint
0	2.83270	
1	4.48826	
2	5.27602	
3	5.80449	
4	6.20549	
5	6.53026	
6	6.80414	6.9
7	7.04261	
8	7.25461	
9	7.44645	
10	7.62264	
11	7.78577	
12	7.94054	
13	8.08763	
14	8.22857	
15	8.36472	
16	8.49731	
17	8.62738	
18	8.75594	
19	8.88387	
20	9.01304	
21	9.14126	
22	9.27241	
23	9.40635	
24	9.54404	
25	9.68650	
26	9.83482	
27	9.99025	
28	10.15341	
29	10.32815	
30	10.51618	
31	10.72077	
32	10.94627	
33	11.19873	11.1
34	11.48704	
35	11.82627	
36	12.24151	
37	12.78364	
38	13.58356	
39	15.25009	

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Instruction Affected by Mathematics Resource Shortages - Principals' Reports Scale, Fourth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item												
			ACBG14AA	ACBG14AB	ACBG14AC	ACBG14AD	ACBG14AE	ACBG14AF	ACBG14AG	ACBG14AH	ACBG14BA	ACBG14BB	ACBG14BC	ACBG14BD	ACBG14BE
Australia	0.89	43	0.68	0.61	0.53	0.45	0.54	0.75	0.69	0.72	0.56	0.75	0.69	0.71	0.77
Bahrain	0.95	62	0.90	0.87	0.83	0.90	0.90	0.79	0.90	0.78	0.81	0.68	0.55	0.44	0.74
Belgium (Flemish)	0.86	40	0.57	0.57	0.68	0.62	0.59	0.65	0.78	0.79	0.52	0.67	0.55	0.49	0.66
Bulgaria	0.82	35	0.67	0.75	0.71	0.66	0.44	0.54	0.69	0.63	0.59	0.41	0.56	0.37	0.57
Canada	0.87	39	0.67	0.62	0.59	0.47	0.62	0.66	0.69	0.67	0.46	0.63	0.75	0.60	0.66
Chile	0.91	49	0.69	0.72	0.70	0.57	0.74	0.70	0.79	0.71	0.67	0.63	0.74	0.68	0.76
Chinese Taipei	0.90	47	0.69	0.68	0.67	0.81	0.70	0.71	0.71	0.71	0.68	0.66	0.64	0.50	0.68
Croatia	0.88	41	0.64	0.67	0.59	0.66	0.65	0.63	0.70	0.61	0.52	0.67	0.66	0.61	0.73
Cyprus	0.91	50	0.84	0.72	0.71	0.72	0.77	0.79	0.74	0.54	0.57	0.72	0.59	0.64	0.75
Czech Republic	0.76	28	0.57	0.57	0.46	0.48	0.52	0.57	0.64	0.61	0.46	0.49	0.27	0.45	0.62
Denmark	0.85	36	0.76	0.61	0.66	0.56	0.61	0.54	0.64	0.73	0.43	0.64	0.49	0.50	0.55
England	0.87	41	0.75	0.63	0.40	0.50	0.44	0.65	0.72	0.70	0.59	0.72	0.70	0.64	0.73
Finland	0.80	30	0.51	0.57	0.66	0.66	0.69	0.56	0.58	0.66	0.48	0.46	0.30	0.31	0.53
France	0.85	35	0.73	0.63	0.49	0.53	0.48	0.53	0.66	0.62	0.65	0.63	0.60	0.58	0.56
Georgia	0.88	43	0.54	0.76	0.63	0.58	0.66	0.69	0.68	0.73	0.70	0.71	0.69	0.43	0.62
Germany	0.83	34	0.65	0.65	0.63	0.45	0.66	0.52	0.71	0.65	0.29	0.60	0.52	0.44	0.63
Hong Kong SAR	0.91	50	0.77	0.80	0.64	0.78	0.74	0.74	0.77	0.64	0.63	0.75	0.65	0.48	0.75
Hungary	0.90	45	0.65	0.73	0.76	0.70	0.65	0.60	0.68	0.71	0.61	0.65	0.58	0.58	0.79
Indonesia	0.86	37	0.63	0.60	0.49	0.70	0.45	0.67	0.67	0.69	0.42	0.67	0.66	0.56	0.63
Iran, Islamic Rep. of	0.84	36	0.75	0.77	0.71	0.81	0.79	0.68	0.52	0.13	0.65	0.42	0.35	0.31	0.46
Ireland	0.86	39	0.67	0.60	0.55	0.59	0.56	0.52	0.64	0.54	0.61	0.72	0.69	0.72	0.67
Italy	0.79	29	0.60	0.60	0.58	0.54	0.64	0.48	0.51	0.54	0.34	0.43	0.46	0.55	0.61
Japan	0.92	52	0.76	0.76	0.76	0.74	0.83	0.66	0.66	0.72	0.59	0.59	0.69	0.75	0.84
Jordan	0.88	42	0.64	0.72	0.73	0.71	0.73	0.69	0.56	0.67	0.65	0.62	0.51	0.50	0.64
Kazakhstan	0.94	58	0.80	0.71	0.69	0.79	0.79	0.79	0.75	0.67	0.83	0.73	0.86	0.63	0.79
Korea, Rep. of	0.90	48	0.76	0.75	0.77	0.73	0.78	0.83	0.66	0.79	0.53	0.56	0.60	0.49	0.66
Kuwait	0.91	50	0.82	0.75	0.75	0.84	0.86	0.72	0.37	0.56	0.83	0.61	0.55	0.48	0.83
Lithuania	0.90	46	0.73	0.74	0.64	0.64	0.57	0.71	0.73	0.63	0.52	0.67	0.69	0.63	0.83
Morocco	0.84	39	-0.05	0.29	0.46	0.57	-0.11	0.75	0.66	0.75	0.78	0.75	0.79	0.82	0.56
Netherlands	0.82	33	0.50	0.50	0.55	0.66	0.52	0.56	0.62	0.63	0.42	0.71	0.60	0.55	0.55
New Zealand	0.87	39	0.70	0.65	0.58	0.52	0.50	0.57	0.62	0.66	0.59	0.72	0.65	0.67	0.66
Northern Ireland	0.85	38	0.74	0.72	0.59	0.59	0.62	0.68	0.51	0.60	0.61	0.65	0.54	0.43	0.62
Norway (5)	0.84	36	0.73	0.71	0.75	0.74	0.70	0.54	0.60	0.62	0.33	0.58	0.57	0.32	0.37
Oman	0.92	50	0.73	0.72	0.67	0.76	0.74	0.78	0.62	0.67	0.83	0.72	0.65	0.52	0.75
Poland	0.91	47	0.74	0.71	0.54	0.71	0.67	0.63	0.72	0.73	0.57	0.74	0.73	0.58	0.81
Portugal	0.89	43	0.53	0.54	0.58	0.54	0.50	0.60	0.76	0.71	0.70	0.75	0.75	0.68	0.78
Qatar	0.98	77	0.93	0.92	0.86	0.94	0.92	0.93	0.89	0.89	0.91	0.80	0.83	0.71	0.87
Russian Federation	0.91	50	0.83	0.77	0.61	0.73	0.67	0.66	0.75	0.68	0.70	0.73	0.78	0.47	0.78
Saudi Arabia	0.88	43	0.71	0.70	0.69	0.78	0.77	0.67	0.70	0.47	0.73	0.65	0.49	0.46	0.55
Serbia	0.91	47	0.79	0.69	0.63	0.68	0.69	0.70	0.75	0.77	0.63	0.62	0.64	0.57	0.72
Singapore	0.97	73	0.90	0.89	0.84	0.90	0.86	0.81	0.91	0.91	0.76	0.76	0.73	0.91	0.89
Slovak Republic	0.91	49	0.80	0.79	0.61	0.72	0.67	0.72	0.81	0.78	0.79	0.66	0.28	0.62	0.70
Slovenia	0.84	36	0.56	0.52	0.57	0.47	0.57	0.52	0.70	0.73	0.33	0.71	0.75	0.57	0.62
South Africa (5)	0.82	37	-0.19	-0.11	0.33	0.63	0.16	0.71	0.84	0.81	0.45	0.83	0.83	0.59	0.67
Spain	0.88	41	0.63	0.66	0.60	0.69	0.55	0.67	0.70	0.71	0.61	0.65	0.67	0.48	0.68
Sweden	0.83	34	0.65	0.63	0.48	0.52	0.52	0.65	0.61	0.69	0.45	0.69	0.44	0.57	0.64
Turkey	0.87	40	0.75	0.71	0.60	0.70	0.69	0.53	0.71	0.51	0.65	0.66	0.62	0.34	0.67
United Arab Emirates	0.96	65	0.87	0.85	0.83	0.87	0.86	0.87	0.83	0.81	0.80	0.70	0.68	0.65	0.82
United States	0.90	46	0.69	0.70	0.69	0.66	0.59	0.70	0.69	0.62	0.61	0.74	0.70	0.67	0.74
Benchmarking Participants															
Buenos Aires, Argentina	0.93	54	0.74	0.78	0.69	0.67	0.83	0.78	0.74	0.69	0.59	0.74	0.77	0.75	0.75
Ontario, Canada	0.87	40	0.59	0.58	0.53	0.42	0.64	0.72	0.68	0.73	0.50	0.66	0.76	0.64	0.65
Quebec, Canada	0.89	44	0.79	0.77	0.67	0.50	0.76	0.59	0.71	0.64	0.36	0.54	0.75	0.56	0.79
Norway (4)	0.84	36	0.73	0.71	0.75	0.74	0.68	0.51	0.64	0.62	0.34	0.59	0.53	0.31	0.40
Abu Dhabi, UAE	0.95	63	0.84	0.84	0.84	0.83	0.85	0.84	0.81	0.77	0.79	0.61	0.69	0.75	0.85
Dubai, UAE	0.97	76	0.90	0.91	0.84	0.93	0.86	0.93	0.89	0.89	0.89	0.86	0.80	0.66	0.91
Florida, US	0.93	55	0.83	0.56	0.79	0.79	0.84	0.74	0.77	0.69	0.76	0.78	0.70	0.46	0.85

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Relationship Between the TIMSS 2015 Instruction Affected by Mathematics Resource Shortages - Principals' Reports Scale, Fourth Grade, and TIMSS 2015 Mathematics Achievement

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Australia	0.12	0.01	0.01
Bahrain	0.08	0.01	0.01
Belgium (Flemish)	0.03	0.00	0.00
Bulgaria	0.10	0.01	0.01
Canada	0.08	0.01	0.01
Chile	0.14	0.02	0.02
Chinese Taipei	0.11	0.01	0.01
Croatia	0.03	0.00	0.00
Cyprus	0.08	0.01	0.01
Czech Republic	0.01	0.00	0.00
Denmark	-0.06	0.00	0.00
England	0.08	0.01	0.00
Finland	0.01	0.00	0.00
France	0.07	0.00	0.01
Georgia	0.09	0.01	0.01
Germany	0.04	0.00	0.00
Hong Kong SAR	0.19	0.04	0.04
Hungary	0.00	0.00	0.00
Indonesia	-0.25	0.06	0.02
Iran, Islamic Rep. of	-0.02	0.00	0.01
Ireland	0.04	0.00	0.00
Italy	0.05	0.00	0.01
Japan	0.00	0.00	0.00
Jordan	-0.07	0.01	0.04
Kazakhstan	-0.06	0.00	0.00
Korea, Rep. of	-0.05	0.00	0.00
Kuwait	0.06	0.00	0.02
Lithuania	-0.10	0.01	0.00
Morocco	-0.12	0.01	0.00
Netherlands	-0.01	0.00	0.00
New Zealand	0.07	0.01	0.01
Northern Ireland	0.02	0.00	0.00
Norway (5)	0.06	0.00	0.00
Oman	-0.02	0.00	0.01
Poland	0.02	0.00	0.01
Portugal	0.05	0.00	0.01
Qatar	0.20	0.04	0.04
Russian Federation	0.07	0.01	0.01
Saudi Arabia	0.04	0.00	0.01
Serbia	0.04	0.00	0.01
Singapore	-0.07	0.01	0.01
Slovak Republic	-0.03	0.00	0.00
Slovenia	-0.08	0.01	0.00
South Africa (5)	0.17	0.03	0.04
Spain	0.11	0.01	0.00
Sweden	0.01	0.00	0.00
Turkey	-0.08	0.01	0.02
United Arab Emirates	0.26	0.07	0.10
United States	0.11	0.01	0.01
International Median	0.04	0.00	0.01
Benchmarking Participants			
Buenos Aires, Argentina	0.10	0.01	0.01
Ontario, Canada	0.06	0.00	0.00
Quebec, Canada	0.15	0.02	0.01
Norway (4)	0.04	0.00	0.00
Abu Dhabi, UAE	0.20	0.04	0.10
Dubai, UAE	0.28	0.08	0.08
Florida, US	-0.07	0.00	0.02

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015